DOCUMENT RESUME

ED 282 551 IR 012 700

AUTHOR Kitchen, Will
TITLE Education and Telecommunications: Partners in Progress.
PUB DATE 11 Mar 87
NOTE 10p.; Testimony to the Senate Committee on Labor and Human Services, March 11, 1987.
PUB TYPE Legal/Legislative/Regulatory Materials (090) -- Viewpoints (120) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adult Education; Continuing Education; Distance Education; *Educational Television; Elementary Secondary Education; Hearings; Networks; *Rural Development; Rural Economics; *Rural Education; *Telecommunications
IDENTIFIERS Congress 100th; Fiber Optics; *Interactive Television; Minnesota

ABSTRACT

America's rural communities are facing increasing challenges to the provision of equitable services and economic stability. Two major rural concerns are the lack of educational opportunities and resources and potentially inadequate telecommunications infrastructures for economic development. In order to attain economic and educational parity with urban areas, a unique cooperative concept is emerging between rural public school systems and local telecommunications providers. Sharing of telecommunications networks can provide educators with an alternative delivery system for two-way interactive television (ITV) to connect multiple school locations. One such partnership, a fiber optic telecommunications partnership between a rural telephone cooperative and seven school districts, the Mid-State Educational Telecommunications Cooperative (MSET), was recently developed in Minnesota. This system is currently delivering 16 high school classes as well as preschool and parenting classes and community education programs in its first full year of operation. Fiber optics technology, which lends itself well to a two-way ITV system because of its high channel capacity, may also contribute to a community's economic development plans by providing a state-of-the-art telecommunications infrastructure for information-based businesses. Partnerships may also be developed using other technologies including microwave, coaxial cable, and satellite. (MES)

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TSA, Inc.
11995 Singletree Lane
Minneapolis, MN 55344
(612) 829-5881

Testimony to Senator Ted Kennedy's Committee on Labor and Human Services

Will Kitchen, March 11, 1987

ED282551

EDUCATION AND TELECOMMUNICATIONS: PARTNERS IN PROGRESS

America's rural communities are facing increased challenges to provide equitable services and economic stability. Geographic distances, isolation, shrinking population bases, and even inadequate telecommunications infrastructures and related services are all obstacles that rural communities must overcome to attain economic and educational parity with urban areas. As a result, rural communities are placing more significance on cooperation.

Today, a unique cooperative concept is emerging between two important rural resources - public school systems and local telecommunications providers (telephone companies, utility companies, cable television companies). Rural school districts and post-secondary institutions can cooperate with other regional educational entities to share limited financial and educational resources. State curriculum mandates, lower funding levels, and limited staff make it difficult for rural schools, AND MANY URBAN SCHOOLS, to provide equitable and comprehensive educational opportunities to the areas they serve.

Thus, a potentially inadequate telecommunications infrastructure, combined with a lack of educational opportunities and resources, emphasizes the need for rural educators and local telecommunications providers to work together. Such cooperation means sharing telecommunications networks to provide educators with an alternative delivery system for two-way interactive television (ITV) to interconnect multiple school locations. ITV systems are designed so that a teacher may teach from any school by transmitting at least one channel of audio and video to other classrooms in any number of other schools or communities. Each classroom or school site is also capable of receiving all of the other classrooms' video and audio signals simultaneously. These ITV systems offer an educationally effective method of delivering distance education to clusters of cooperating schools. With ITV, a teacher in one district can now teach a course in which students may be located in three or more remote locations. Using television cameras, monitors, and a microphone system in each classroom, the teacher can see and hear all of the students, all of the students are able to see and hear the teacher, and all of the students are able to see and hear each other.

By forming unique, mutually advantageous, business-education partnerships, both parties share the cost and the use of the system. To understand how such partnerships work, it is helpful to examine one recently developed fiber optic project in Minnesota.

IR012700

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The first fiber optic telecommunications partnership was formed between a rural telephone cooperative and a consortium of seven Minnesota school districts. The Upsala Telephone Cooperative from Upsala, Minnesota and the Mid-State Educational Telecommunications Cooperative (MSET) joined forces to interconnect these school districts via a 78 mile fiber optics network to provide an ITV system for educational use and an upgraded telephone system for the Upsala Telephone Cooperative's use.

The MSET system is currently delivering 16 high school classes, pre-school and parenting classes, and community education programs in their first full year of operation.

Indicative of the growing involvement and interest in telecommunications networks similar to the previous example is that over 40 per cent of Minnesota's 433 school districts and a majority of its post-secondary institutions are currently exploring the development and implementation of ITV. By the fall of 1987, an estimated 90 schools in Minnesota will be delivering educational programming through these ITV networks. I personally have worked with, or know of, projects and interest in the 35 states listed on the chart.

From 1983 to 1986, the Minnesota State Department of Education conducted extensive research on the eleven Technology Demonstration Sites that implemented ITV. The results and findings of this evaluation confirm the effectiveness and importance of telecommunications in education. The following summarizes the Minnesota findings:

1. ITV allows schools to offer a wider range of elective courses and permits students greater access to subject matter.

2. ITV requires cooperation among schools. While difficult, this has led to improved programming which individual schools, acting alone, would have found difficult or impossible to provide.

3. Teachers require training, preparation and support to deal successfully with teaching on ITV. When these factors are present teachers can adapt to and enjoy teaching on ITV. 75% of the teachers who taught on ITV would choose to do so again.

4. Students enjoy learning on ITV and are motivated by it.

5. No systematic, statistically significant difference in achievement was found between students taking courses traditionally and those in ITV sections. The medium does not appear to influence achievement.

6. ITV seems to be particularly appropriate for language and math instruction, for which it is heavily used.

8. ITV can be relatively expensive as a delivery system. However, costs can be reduced through business/education partnerships, cooperative purchasing, and planning.

TELECOMMUNICATIONS IN EDUCATION HEARING
Witness List

2:00 p.m., Wednesday, March 11, 1987
Room 430, Dirksen Senate Office Building

1. International Use of Telecommunications

Sandra Lauffer
Program Officer, International Education & Exchange Programs, International Division, Academy for Educational Development
Former Director of Information for AID Rural Satellite Program, Agency for International Development
Former Senior Executive for Public & Media Relations, International Telecommunications Satellite Organization

2. Domestic Use and Potential

Dr. Joseph Duffey
Chancellor, University of Massachusetts at Amherst
Former Director, National Endowment for the Humanities

Henry Cauthen
President and General Manager
South Carolina Educational Television Network

Will Kitchen
Vice President
Tele-Systems Associates, Inc.
Minneapolis, MN

3. Student Panel

Alda Monteiro
Senior at East Providence Senior High School, East Providence, Rhode Island

Benjamin Stavely
Junior at Alvirne High School, Hudson, New Hampshire

4. Teacher Panel

Marilyn Gardner
Director of Instructional Technology, Boston Public Schools
Chair, Technology Committee, Council of Great City Schools

Robert Bennett
Advanced Placement Physics Teacher, Wakefield High School, Wakefield, Massachusetts

America's rural communities are facing increased challenges to provide equitable services and economic stability. Geographic distances, isolation, smaller population bases, and more recently, inadequate telecommunications infrastructures and related services are all a part of the obstacles that rural communities must overcome in order to provide educational equity with urban areas and more attractive to businesses and economic development. As a result of this situation, there is more significance being placed on cooperation in rural communities. Cooperatives grew out of rural America and now cooperative ventures may provide rural America with a vehicle to again be competitive with urban communities and yet keep their distinctive identities.

A most unique cooperative concept is just now beginning to develop between two of rural America's most important resources, the public school systems and the telephone cooperatives. Rural school districts need to cooperate with other regional school districts in order to share their limited financial and educational resources. State curriculum mandates, lower funding levels, and limited numbers of staff are making it difficult for these school districts to provide equitable and comprehensive educational opportunities for their students, staff and community residents.

At the same time, the evolution of America's economy from manufacturing-based to one which is information-based poses yet another obstacle for rural economic development. Information sector businesses are expected to create a majority of the new jobs in the future and all businesses are becoming more reliant on telecommunications technologies to handle their communications and information distribution needs. However, many existing telecommunications infrastructures in rural communities may not be designed to adequately meet the rapidly growing demands and needs of small and large businesses for high-speed, high-volume, and cost-effective data, audio and video transmission.

These two major rural concerns: 1) lack of educational opportunities and resoources, and, 2) potentially inadequate telecommunications infrastructures for economic development emphasize the need for educators and telephone cooperatives to join together to co-share telecommunications networks which will provide education with an alternative delivery system for two-way interactive television interconnecting multiple school districts, and, rural telephone cooperatives with an opportunity to upgrade their current systems to provide their communities with a telecommunications infrastructure that may become an important aspect in local economic development. By forming a unique, mutually-advantageous business/education partnership or cooperative, in which both parties share the cost and the use of the system, can many of the needs of the school districts, telephone cooperatives, and rural communities be met.

How specifically do these partnerships or cooperatives work? While each situation and partnership is unique, it will be helpful to examine two recent fiber optics projects located in Minnesota.

Mid-State Educational Telecommunications Cooperative (MSET)

The first fiber optics telecommunications partnership ever developed between a rural telephone cooperative (Upsala, MN) and a multi-school district consortium (MSET) began in 1985 and has been operational since January 1986. Seven school districts, located in the central Minnesota communities of Holdingford, Little Falls, Long Prairie, Pierz, Royalton, Swanville, and Upsala have co-constructed a 78 mile fiber optics network consisting of four to eight fibers in conjunction with the Upsala Telephone Cooperative. The distance separating the towns ranges from ten to eighteen miles and the Upsala Telephone Cooperative serves only two of the seven communities (Upsala and Swanville) with telephone service. Using Pirelli Optronics analog transmitters and receivers over MSET's two fibers, the fiber optics network provides seven video channels or one for each school district to use. The Upsala Telephone Cooperative, using the other two to four fibers, will be using the network to upgrade their telephone system and to carry all of their long distance toll calls to an AT&T switch thus by-passing the Bell Operating Company which used to carry this traffic.

EDUCATIONAL USE

By being able to transmit one channel of video, with audio, from each high school and with the capability of each high school being able to receive all of the other six high schools' signals simultaneously, this system provides the most educationally effective and accepted alternative method of delivering distance education. These systems, called two-way interactive television, provide an opportunity for small, rural school districts to share and offer low-incidence and new courses in their curriculums. A teacher in one district is now able to teach a class, whose students may be located in three different high schools, via the two-way interactive television system. Using television cameras and monitors and a microphone system in each classroom site, the teacher is able to see and hear all of the students, the students are able to see and hear the teacher, and all of the students will be able to see and hear each other.

The MSET project, whose K-12 district student populations range in size from Upsala's 444 to Little Falls' 3086, is currently delivering 16 different high school classes in their first year of operation. The courses being offered are:

Spanish I (two classes)
German II
Accounting II (two classes)
Advanced Computers
Music Theory
German I (two classes)
French I (two classes)
Advanced Placement English
Computer Logic
Shorthand

In addition to the high school classes, adult community education classes, staff in-service programs, interdistrict meetings, and other similar programs are being offered over the system. In the near future, college classes for community residents, school district staff, and high school students.

TRI-COUNTY TELECOMMUNICATIONS COOPERATIVE

Another cooperative project that is under development is the Tri-County Telecommunications Cooperative in Grand Rapids, Minnesota. The entities that are involved in this project include six school districts (Coleraine, Deer River, Grand Rapids, Hill City, Nashwauk-Keewatin, and Remer), two community colleges (hibbing and Grand Rapids), five small, independent telephone companies (Arvig Telecom, Johnson Telco, Paul Bunyan Telco, People's Telco, and Northland Telco), and a Minnesota-based long distance carrier (U.S. Link).

This eventual network, when completed, will consist of 140 miles of fiber optics cable and will consist of eight to twelve fibers. The telephone and educational uses will be similar to MSET's except that this network will provide the opportunity for U.S. Link to offer community residents with an option for their long distance telephone service where there is now only AT&T.

The cost of the fiber and construction is being shared equally among the telephone companies and the school distrcits. There is a chance that a local grants foundation may provide funding to pay for a major portion of the initial construction. The proposed partnership arrangement calls for the schools to own the rights to to use a minimum of two of the fibers in the system and the telephone companies would own or lease the remaining fibers for telephone traffic. The maintenance of the system will be provided by the telephone companies on a time-and-materials only basis. The first 18 miles of this system has been constructed between Hill City and Remer and the remainder of the system will be completed in 1987.

While fiber optics technology has been mentioned as the technology medium for both examples, this does not limit the development of partnerships using other technologies including microwave, coaxial cable, and satellite. Schools and telephone cooperatives may be able to share the use of microwave towers or develop maintenance agreements for existing or developed educational telecommunications systems. In other instances, the telephone cooperatives may be able to be hired by the schools for engineering work or to assist in obtaining rights-of-way for stringing wire between school districts.

Fiber optics technology is emphasized here because it does lend itself well for two-way interactive television systems due to its high channel capacity and that the fiber optics system may contribute to a community's economic development plans by providing a state-of-the-art telecommunications infrastructure for information-based businesses. The fiber optics prices for electronics and cable have also become very competitive recently and provides an alternative to twisted-pair copper or microwave.

CONCLUSION

The development and use of business/education telecommunications partnerships for rural America is a concept whose time has come. These partnerships may provide hope to rural communities by being a catalyst for economic development and stability. With these partnerships and telecommunications systems in place, rural educational entities and telephone cooperatives will have the opportunity to deliver services to their communities that rival the services available in urban areas. While these systems are not the only answer to meeting the needs of rural America, its a major step. With these systems in place there is hope for rural America, without these systems there is not even hope.

TELE-SYSTEMS ASSOCIATES, INC. (TSA) of Minneapolis, Minnesota, provides the consultation and guidance for these two projects, as well as others around the country. TSA is a consulting company whose philosophy and practice is to develop business/education partnerships that will provide rural communities with an alternative way to deliver enhanced and enriched educational opportunities to students and adults and to assist the telephone cooperatives/companies with a more cost-effective way to improve their telephone systems. TSA provides a variety of services to its clients including technical and educational planning, development, and implementation. Specific services available include technical design development, partnership development, financing alternative identification, teacher training workshops, grants development, and legislative lobbying.

TELE-SYSTEMS ASSOCIATES, INC.

Will Kitchen, Dennis Pellant and Terry Griffiths

From the May 2, 1986 conference - Technology in Education and Training
St. Paul, MN